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Over a Dozen Years of RECLAIM Implementation: Key Lessons Learned in California's First Air Pollution Cap-and-Trade Program

South Coast Air Quality Management District

June 2007



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ACRONYM LIST

ACKNOWLEDGEMENTS

PREFACE

The intent of this paper is to provide insights into what has worked well and what, in hindsight, could have been done differently to improve program effectiveness during development and implementation of RECLAIM. District staff spent several years in the development of RECLAIM, and has 12 years of implementation experience. This paper provides an overview of the District staff's experience with the RECLAIM program. Many lessons have been learned through RECLAIM and other local programs which will benefit future regulatory efforts in the South Coast Basin and elsewhere.

This paper also shares information that has been gained in taking economic theory for a cap-and-trade program into design and implementation. Over a decade of real world experience in implementing one of the largest air pollution cap-and-trade programs in the United States allows District staff to offer many practical suggestions for future cap-and-trade programs.

The RECLAIM program is California's first air pollution cap-and-trade program, and encompasses most of the Basin's largest nitrogen oxides (NO_x) and oxides of sulfur (SO_x) stationary sources. It was developed to make significant progress in cleaning up the worst air in the nation. It is a multi-industry program with each facility having annual allocations and declining balances. Developed in the early 1990s, RECLAIM was seen as an innovation compared to previous command-and-control programs. Benefits included lower costs and greater flexibility for industry participants, and secured emission reductions with better emissions monitoring for environmental and community interests.

Some community, environmental, and environmental justice groups continue to believe that cap-and-trade programs slow overall pollution reduction efforts and may increase local pollution hot spots, or at a minimum, delay progress in some communities. However, the business community continues to strongly support cap-and-trade programs as a more economical and efficient way to achieve pollution reduction goals and a possible means to foster technology advancement. District staff, based on its overall experience with implementation of the RECLAIM program, continues to support the use of cap-and-trade programs, and believes that compliance flexibility

is needed in a region with extreme air pollution problems. Such programs should be used in combination with traditional command-and-control approaches.

This document has an Executive Summary, two main parts (design and implementation), and a conclusion/recommendation section. Key lessons learned are highlighted in the Executive Summary and at the end of each chapter. This paper was written by District staff in the spirit of being frank about the program successes and problems.

EXECUTIVE SUMMARY

Introduction

This paper describes RECLAIM design and implementation and lessons learned that could provide valuable insight to those responsible for developing and implementing future cap-and-trade programs. After an overview of RECLAIM's background, the key lessons learned are summarized in this Executive Summary, with more detail provided in Parts One and Two.

Background

RECLAIM, the REgional CLean Air Incentives Market, was a landmark multi-industry cap-and-trade program adopted by the South Coast Air Quality Management District in 1993. Over 300 facilities are in the NO_x (Oxides of Nitrogen) market and 33 facilities are in the SO_x (Sulfur Oxides) market. RECLAIM was designed to match expected reductions required by the year 2003 from existing rules and commitments in the 1991 Air Quality Management Plan (AQMP). It replaced a command-and-control approach with facility caps and declining balances of allowable maximum emissions. RECLAIM was developed in the midst of an economic down-turn during the

early 1990s. Facilities were allowed to base their allocations on production levels that existed prior to the recession.

Emission caps that decline over time ensure that reduction goals are achieved. In contrast, command-and-control rules establish a fixed emission rate, but do not limit mass emissions, so that economic growth can interfere with expected emissions reductions. Credits have a one-year life and no banking is allowed. Industry participants have more stringent monitoring and reporting requirements than under command-and-control, but have flexibility to meet their annual caps in the most economical manner. Because facilities can trade emissions below their cap, or purchase credits if they need to, credits have monetary value, and emissions are now part of the economic 'bottom line'.

RECLAIM has many of the design features that economists recommend for a robust market:

- A large number of diverse industries;
- Clear reduction targets;
- Clearly defined trading unit
- "Offsets" – mobile and area source credit programs.

In addition, RECLAIM retained a new source review (NSR) element for a new equipment and modification of equipment with emission increases. This important element recognizes that it is a more cost-effective to control at the design phase than it is to retrofit existing equipment. Facilities modernizing equipment would have lower emissions and therefore require less credits.

There are several features of RECLAIM that have worked well, and the program has resulted in an additional 68 percent (27,643 tons) and 59 percent (6,073 tons) decrease in allowable emissions for NO_x and SO_x, respectively; and a 62 percent (15,758 tons) and 50 percent (3,611 tons) reduction in actual emissions for NO_x and SO_x, respectively since 1993. The program was designed, in aggregate, to match emission reductions projected for the facilities in the program for key milestone years (2000 and 2003) from the 1991 AQMP. It locked in an actual emissions cap, which provided more certainty for the environment than a command-and-control approach, which is based on emission rates per equipment. Under command-and-control, total emissions can increase, even though allowable emission rates decrease, if there is growth at a facility or an industry.

RECLAIM also secured reductions expected from rules that had not yet been written and may have required technology to be developed or to be transferred from other applications.

Except for the California power crisis in 2000 and 2001, compliance with facility caps has been very high (96 to 98 percent), and actual emissions, in aggregate, have typically been approximately 20 percent below allowable, or permitted, levels each year.

In hindsight, there are issues in the design and implementation that could have been done differently to avoid problems that have occurred. Probably the most difficult design challenge for any trading program is setting fair and appropriate allocations. RECLAIM was developed in the midst of an economic recession, so there were strong concerns that transitioning to a mass cap in lieu of emission rates should not restrict economic growth.

To accommodate business fluctuations, to recognize unique differences among facilities, to reward early reductions, and to provide flexibility, starting allocations for the year 1994 were based on reported annual emissions from 1987 to 1992, with the year

chosen by each individual facility. This led to a starting point for the program that was higher than actual emissions, because each facility picked maximum production levels for the basis of their allocation. Other factors also increased the total starting point. For example, many facilities amended prior emission reports (almost exclusively to increase emissions) and traditional Emission Reduction Credits (ERCs) held by facilities were converted to RECLAIM Trading Credits (RTCs).

The program had set points (2000 and 2003) that were anchored to match the 1991 AQMP emission projections. However, high initial allocations led to a ready supply of credits until the year 2000, which resulted in a sense of complacency by many facilities and reduced the pressure to install controls. Models of the program assumed rational economic behavior, where facility owners and operators would add controls when it was to their economic advantage, but this did not always occur.

Until the power crisis, an ample supply of credits at year end and some short-term thinking by many corporate decision makers contributed to program emission exceedances seen in 2000 and 2001. This was the same time that the program was

reaching the ‘crossover’ point, where actual emissions would be expected to exceed allocations unless emission reduction controls were installed at facilities.

When California experienced an energy crisis in 2000 and 2001, power generators began to put old, high emitting equipment back into service. Power plants quickly used their allocations and bought up available credits in the market. This resulted in rapid price increases, and a scarcity of credits for facilities that routinely purchased credits during the reconciliation period.

There was not enough time for facilities to plan, budget, and install controls in order to meet their annual caps. The convergence of the power crisis and the crossover point contributed to the credit scarcity. In response to the power crisis, the District staff amended the RECLAIM program. A number of steps were taken to stabilize NOx credit prices, require controls on power plants and mitigation of excess emissions, as described in Part Two, Chapter 3.

RECLAIM implementation experience has reinforced the conclusion that the resources needed to support a cap-and-trade program (issuance of facility permits, certification of continuous emission monitors (CEMs), as well as development of new inspection and

prosecution methods and guidelines, trading systems, and information management programs) are significant and must not be underestimated to assure program success.

Program Performance

The following information highlights key program performance elements over the last twelve years.

- **Emission Targets Achieved** – SO_x annual targets have been met every year. NO_x annual emissions have met the target every year except 2000 and 2001, when California experienced an energy shortage. Rule amendments required isolation of the power plants from the rest of the market, control equipment installation, and mitigation of excess emissions at power plants.
- **Additional Reductions Required**– In 2005, the program was amended to require an additional 22.5% reduction in NO_x allocations by 2011, based on advances in emission control technology.
- **Robust Credit Market** – There is a very active market for trading RECLAIM credits, with more than 863 million dollars in trading value and a

volume in excess of 20,000 tons to date. The market has evolved over the years, with current trades including facilities, brokers, investors, foreign traders, and mutual funds.

- **Environmental Justice** – The program was designed to prevent any significant localized impacts by requiring air quality modeling for increases beyond starting allocations.

The body of this paper highlights key lessons learned for each main topic area that the District staff believes are important to consider in development of future cap-and-trade programs. Some of the main lessons learned and recommendations are summarized below.

Program Design

- Include extensive participation from all parties at all stages.
- Clearly define the objectives, goals, and required outcomes.
- Establish the criteria for inclusion early in the process.
- Establishing the baseline and emission reduction targets equitably is one of the most contentious and difficult parts of a trading program.

- Recognizing early reductions is important.
- Carefully consider which existing requirements, if applicable, are rolled into the overall program goals, rather than be left in place as source-specific requirements.
- Allow time to develop, test, and implement allocation methods.
- Tensions between capping emissions, fair allocations, and program goals need to be carefully balanced.
- Develop programs to implement requirements to ensure that emissions are properly characterized and the trades are valid.
- Consider resource implications and ensure that they are adequate.
- Develop mechanisms to recover agency costs.
- Streamline administrative processes and post trade information in as timely a manner as possible.
- Develop criteria and mechanisms for auditing program performance.

Legal Issues

- Cap-and-trade programs present unique enforcement issues.

- Enforcement of program requirements is critical to a successful program.
- Allocations or credits are not a property right.
- Trading by out-of-state or out-of-country participants presents special enforcement challenges.

Prosecution Issues

- Different types of violations and penalty provisions are needed for a market program.
- Requiring data and reports to be certified for accuracy facilitates admissibility at trial and provides enforcement flexibility for false statements.
- Evidentiary presumptions and burdens favoring the government are essential for successful prosecution of violations.

Information Management

- The complexity of a cap-and-trade program necessitates computer automation.
- The level of automation must consider cost, complexity, and time required for implementation.

- Automation design should be concurrent with the design of the cap-and-trade program, where possible, to avoid costly retrofitting.
- Reliable and easily accessible electronic emission monitoring and reporting systems are essential for generating and collecting accurate information on actual emissions, which, in turn, is critical for determining compliance and ensuring success of a cap-and-trade program.
- Use technology to help provide information access to the regulated community, emission credit traders, and the public.

Part Two – Implementation

Early Implementation

- Fair allocations must be based on accurate emission inventory, a detailed methodology, and clear criteria for resolving disputes.
- All requirements must be conveyed in a comprehensive document (e.g. permit).
- Open and continued dialogue with all stakeholders helps in resolving issues.

- Mechanisms to refine program elements must be in place.
- Expert groups should be in place to help resolve unique technical issues.
- Adequate time and resources must be allocated for successful program implementation.

On-Going Implementation

- A uniform emission monitoring data set will allow for efficient checking.
- Train personnel and update procedures.
- CEMS installations need to be well planned, quality assurance steps need to be adhered to, and maintenance requires skilled personnel.
- Consistent and fair enforcement of provisions is essential and emission audit results need to be timely conveyed.

Mid-Course Corrections

- Extraordinary high demand on credits from a single market sector concurrently with the advent of the crossover point caused prices to skyrocket within a matter of months in RECLAIM.

- Emission controls cannot be installed in time to respond to a sudden surge in demand.
- Build in requirements that are automatically triggered to avoid such problems.

Market Issues

- Market participants do not always act in a logical manner.
- Timely trade information is vital to the market.
- Trade information can affect price.
- Safeguards against fraudulent trades must be instituted.
- The role of the investor must be balanced with credit availability.

Lessons Learned for Consideration in Future Trading Programs

This section distills the lessons learned in specific topic areas to the most critical overall elements to consider for future trading programs.

- **Engaged Stakeholders** - Early and frequent stakeholder involvement is critical – keep in mind the key interests and ensure that each group perceives some positive outcomes.
- **Equity and Fairness in Allocations** - Determining allocations is one of the most sensitive and difficult parts of program design.
- **Robust Emission Information** – Accurate emission quantification is necessary to ensure that the environmental benefits are realized and that reductions being traded are real.
- **Dispute Resolution** - An administrative mechanism is necessary to resolve differences.
- **Market Issues** - Market issues are critical design considerations – types and term of credits, whether banking is acceptable, types of markets, and who manages the trades.
- **Integration** - Integration of monitoring reporting and recordkeeping requirements, permitting, inspections, and tracking emissions and trading are critical to successful program implementation.
- **New Enforcement Tools** - Develop specific penalties and backstops for non-compliance.
- **Resources and Time** - There must be adequate resources and time to design, implement, and monitor the program.
- **Foundation** - The technical, economic, and political foundations must be solid.

- **Program Assessments** - Build in periodic program assessments and make program changes as easy as possible.
- **Planning** - Make sure participants plan ahead to avoid problems like those seen in RECLAIM due to the energy crisis. Allocations and ‘crossover’ points should be considered.
- **Environmental Justice** – Consider whether restrictions are necessary on maximum credit purchases in lieu of emission reductions on site. Provide information to stakeholders on whether there are local impacts. If there could be local impacts, consider incentives for local reductions rather than credit purchases.
- **Balance** - Make sure other programs still have adequate resources and attention.

The rest of this paper provides more detailed information relative to the RECLAIM experience and lessons learned that can help in development of future trading programs.

On balance, District staff believes that the RECLAIM program has proven to be a valuable tool in reducing air pollution in the South Coast region.

PART ONE – RECLAIM DESIGN

Chapter One – Program Conception

Author: Jill Whynot

Feasibility Study

Introduction

In 1990, the District began a one year feasibility study to develop a concept for a trading program.

Throughout the Feasibility Study, a series of five working papers were developed. The first four papers set forth the framework for an emissions trading program, while the fifth evaluated the potential socio-economic and air quality impacts of the program. The five working papers were:

- Working Paper #1: Emission Reductions – “Establishing the Foundations”
- Working Paper #2: Permitting – “The Implementing Mechanism”
- Working Paper #3: Enforcement – “The Critical Element”
- Working Paper #4: Emissions Trading – “The Centerpiece”
- Working Paper #5: Air Quality Assessment and Socio-economic Impacts –
“Implementation: Implications for the Basin”

Recommendations from these five working papers were refined and summarized to form the proposal for the RECLAIM program. In March 1992, the District initiated rule development.

Design Criteria

Throughout the Feasibility Study and rule development, program elements were consistently evaluated against five criteria:

1. **Enforcement** – The new program must provide a confidence level equal to or greater than the existing air pollution program.

2. **Emission Reductions (Air Quality Improvements)** – The new program must have emission reductions equal to or greater than the commitments in the rules and future control measures from the 1991 AQMP.
3. **Implementation Costs** – The new program must have lower costs than what was projected for the rules and control measures that it replaced.
4. **Job Impacts** – The new program must have less job impacts than projected in the 1991 AQMP.
5. **Adverse Public Health Impacts** – should not result from implementation of the program.

These principles were very helpful as the program and alternatives were discussed, developed, and ultimately adopted and implemented. Development included an extensive public process, which was important in shaping the program and gaining stakeholder acceptance. RECLAIM was also developed to meet all federal and state requirements, such as state and federal New Source Review and federal Economic Incentive Program Guidelines. The fundamental elements for reductions eligible for trades included that the reductions were real, quantifiable, surplus, and enforceable. This is accomplished through permit conditions and robust monitoring, reporting, inspection, and penalty provisions. The program includes annual and three-year evaluations that cover several key program features.

Rule Development Process

The rule development process for RECLAIM took about two and a half years. Steering and Advisory Committees met regularly with staff. In addition, 3-agency meetings (the District, CARB and EPA) were a regular feature as the rule development ensued. Seven working groups were also formed for NO_x and SO_x RECLAIM (some also had technical subcommittees):

- Administrative Structure (initially referred to as the Baseline Working Group);
- NO_x and SO_x Monitoring Protocols;
- Mobile Source Advisory;
- Trading Market;
- Enforcement and Penalties;
- Energy Impacts; and

- Socioeconomic and Environmental Impacts.

In total, there were over 50 meetings of steering and advisory committees and working groups. Two working groups related to volatile organic compound (VOC) trading were also formed, but these are not discussed here.

An active, open public process helps develop a better program

Rules

The initial program consisted of 12 rules, including:

- 2000 General (adopted October 1993, amended 6 times);
- 2001 Applicability (adopted October 1993, amended 5 times);
- 2002 Allocations for Oxides of Nitrogen (NO_x) and Oxides of Sulfur (adopted October 1993, amended 3 times);
- 2004 Requirements (adopted October 1993, amended 4 times);
- 2005 New Source Review for RECLAIM (adopted October 1993, amended 7 times);
- 2006 Permits (adopted October 1993, amended 2 times);
- 2007 Trading Requirements (adopted October 1993, amended 7 times);
- 2008 Mobile Source Credits (adopted October 1993);
- 2010 Administrative Remedies and Sanctions (adopted October 1993, amended 3 times);
- 2011 Requirements for Monitoring, Reporting, and Recordkeeping Oxides of Sulfur (SO_x) Emissions (adopted October 1993, amended 12 times); and
- 2012 Requirements for Monitoring, Reporting, and Recordkeeping Oxides of Nitrogen (NO_x) Emissions (adopted October 1993, amended 12 times).

Rules 2011 and 2012 also included extensive, detailed protocols for monitoring, recordkeeping and reporting. Most of these rules have been amended many times to address situations not envisioned when the rules were adopted, to improve enforceability, and to clarify intent. Parenthesis after each rule listed above indicates the number of rule amendments. Only Rule 2008 – Mobile Source Credits, remains in its original form.

Other rules were added later, to address the power plant crisis. These include:

- Rule 2009 Compliance Plan for Power Producing Facilities (adopted May 2001, amended once);
- Rule 2009.1 Compliance Plans for Forecast Reports for non-Power Producing Facilities (adopted May 2001); and
- Rule 2020 RECLAIM Reserve (adopted May 2001).

Several mobile source credit generation rules and one area source credit generation rule were also adopted to enable flexibility to use non-traditional emission reductions in RECLAIM. The intent was to provide a mechanism for federally approved reductions if such projects were more cost-effective than on-site reductions or RTC purchases. These rules included:

- 1612.1 Credits for Clean On-Road Vehicles (adopted March 2001);
- 1631 Pilot Credit Generation Program for Marine Vessels (adopted October 2002, amended once);
- 1632 Pilot Credit Generation Program for Hotelling Operations (adopted May 2001);
- 1633 Pilot Credit Generation Program for Truck/Trailer Refrigeration Units (adopted May 2001);
- 1634 Pilot Credit Generation Pilot Program for Truck Stop Electrification (adopted November 2001); and
- 2507 Pilot Credit Generation Program for Agricultural Pumps (adopted May 2001).

Lessons Learned

- Involve the public early and often to earn their trust. Freely share information on trades, emission reductions, and program implementation.
- Agency accountability is key to a successful program. Trading data should be readily accessible, such as via a website, and annual reports are needed to monitor the program process.
- Trading programs are very resource intensive to design, develop into regulations, translate into permits, and implement.

- The foundation of any trading program is robust monitoring, reporting, and recordkeeping. It is key to ensure that reductions are real and credits are valid.
- Compliance with annual targets is not enough. Compliance plans and quarterly reports from facilities help ensure that annual targets will be met.
- Effective inspection and enforcement are needed to ensure a high compliance level. Permit conditions are an effective mechanism for requiring the emission reductions and monitoring requirements.
- Closely monitor credit prices and develop mechanisms to react to unforeseen, sudden changes in the price and/or availability of credits.

Chapter Two – Key Design Features

Author: Jill Whynot

Basic Description

RECLAIM includes permitted stationary sources that emitted 4 tons or more of NO_x or SO_x in 1990 or any later year. Emissions are “bubbled” and each facility is given specific annual emission caps. The allocations were based on recent past peak actual emissions, adjusted for the beginning and ending years based on compliance with existing rules and future control measures in the 1991 AQMP that would have affected the equipment or process at the facility. This method was labor-intensive, but resulted in a more equitable distribution of emissions that had general support from industry. The market, as a whole, produced equivalent emission reductions expected from the AQMP for such sources, but each facility has the flexibility to design its best approach to meeting their declining emission cap, rather than reacting to specific command-and-control rules. The “incentive” portion of the program involves trading RTCs. RTCs are valid for one year, and expire after a 60 day year-end reconciliation period. Any facility that emits or will emit less than its cap in a given year may sell the extra credits. A facility that needs to increase production, add equipment, or needs more time to add control equipment may buy credits on the market. Certain mobile and area source credits were available for use for several years in RECLAIM.

Two-Cycle System

When RECLAIM was being developed, a team of consultants from the Pacific Stock Exchange and California Institute of Technology recommended a two-cycle approach, which was included in the program design. Initially, half of the facilities were designated as Cycle 1, and had allocations (RTCs) issued on a calendar year basis (credits valid January 1 through December 31 of each year). The other facilities had RTCs issued on a fiscal year basis, with issue dates of July 1 and expiration dates of June 30 each year. The intent was to provide better market signals by having reconciliation with annual emissions twice a year.

A once per year reconciliation for all facilities could have been more prone to market excesses or shortages and greater price fluctuations. RECLAIM did not include banking because of the need

to match the AQMP key milestone years. Providing limited banking or borrowing in future trading programs may help establish a program with initial allocations closer to actual emissions.

Inclusion Criteria

A four ton per year emission threshold was the basis for inclusion in the program, although many industries were specifically excluded for various reasons (such as essential public services, restaurants and dry cleaners). This brought in large and medium facilities with a diverse industry base to foster a more robust market. RECLAIM includes opt-in provisions, but once a facility is in the program, it cannot revert back to command-and-control.

Facility Permits

A facility permit was generated for each facility to consolidate all requirements, including the amount of RTCs held each year. RECLAIM includes improved monitoring and reporting requirements which are included in the permits. The facility permit was also designed with Title V in mind.

Monitoring, Reporting and Recordkeeping

RECLAIM provided much more flexibility to industry participants than traditional command-and-control rules. To provide adequate enforceability with mass emissions at the facility level rather than equipment specific instantaneous concentration limits, significant enhancements were made to emissions monitoring, recordkeeping, and reporting requirements.

For NO_x, three tiers were set up for emission quantification and reporting requirements. The majority of emissions are from what is termed major sources, which are required to have CEMS. Major sources generally include combustion equipment with maximum rated capacity ≥ 40 mmBtU per hour, internal combustion engines $\geq 1,000$ bhp, gas turbines ≥ 2.9 megawatts and petroleum fluid catalytic cracking and tail gas units, very large kilns, and other high-emitting equipment.

Other tiers of monitoring include large sources (combustion equipment with lower annual heat input ≥ 10 and ≤ 40 mmBtU per hour, for example), which requires totalizing fuel meters and

electronic monthly reporting. The smallest equipment is in the process unit reporting tier, which also requires a totalizing fuel meter or timer and quarterly mass reporting.

For SO_x, there are two tiers – major sources and process units. Monitoring and reporting requirements are similar to those for NO_x sources in the same tiers.

The rules for NO_x and SO_x monitoring, reporting, and recordkeeping include extensive, detailed protocols that cover CEMS, periodic reporting for large sources, source testing requirements, electronic reporting, and reference methods. Attachments to the protocols include detailed specifications for missing data, bias tests, equipment tune-ups, quality assurance and quality control, and CEMS performance.

Table I-1-1 summarizes monitoring requirements and reporting frequency for RECLAIM sources.

Table I-2-1
Monitoring Requirements for RECLAIM Sources

Source Category	Major Sources (NO _x and SO _x)	Large Sources (NO _x only)	Process Units and Rule 219* Equipment (NO _x and SO _x)
Monitoring Method	Continuous Emission Monitoring System (CEMS)	Fuel Meter or Continuous Process Monitoring System (CPMS)	Fuel Meter and/or Timer
Reporting Frequency	Daily	Monthly	Quarterly

* Rule 219 equipment refers to equipment that does not require an AQMD permit. This is generally small, low-emitting equipment.

Missing Data Provisions

A set of substitution procedures, known as Missing Data Procedures, is incorporated into the RECLAIM rules to provide for determining emissions when actual emission data are not obtained by a CEMS or other greater monitors. These procedures provided for very stringent, conservative, emission substitution procedures at the beginning of the program when little or no valid CEMs data were available. This results in an incentive to correct problems quickly. During the initial years of the program when CEMs were being installed and certified, many facilities had substantial periods of missing data. This required retirement of many RTCs to

cover the worst-case emissions that could have occurred. Due to the large initial allocations at the beginning of the program, possible over-estimates of emissions were readily covered by available RTCs. As monitoring instrumentation was installed and properly established, missing data in later program years is based on previous monitored data and now more accurately represents actual emissions likely to be occurring during monitor outages. Missing Data Procedures also use average CEMS data in cases where the CEMS have consistent performance and high data reliability. These data substitution procedures also provide added incentives to maintain the CEMS in good operating conditions.

Table I-1-2 shows the percent of reported emissions from missing data provisions in RECLAIM over time. Note the very large percentages in the first year of program implementation, compared to relatively low use of missing data in more recent years.

Table I-2-2
Percentage of Reported Emissions Using Missing Data Provisions

	Percent of Reported Emissions Using Substitute Data										
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
NO _x	23%	20%	18%	7.3%	9.6%	6.5%	8.1%	3.4%	4.5%	8.3%	3.0%
SO _x	40%	16%	16%	13%	20%	10.7%	11%	4.8%	4.7%	10.4%	3.6%

Inspections and Violations

RECLAIM was a significant change from traditional concentration-based command-and-control rules. It therefore required many changes to how field personnel conducted inspections and identified violations. In addition to new audit procedures, different types of violations and penalties now apply.

Program Assessments

An additional design feature that was added to RECLAIM was annual and periodic program assessments. The requirements for these assessments are in Rule 2015 – Backstop Provisions. This rule also lays out specific actions that are required in the event a program assessment shows

that average credit prices are above a certain threshold or other events occur. Annual audits include:

- Emission reductions;
- Per capita exposure to air pollution;
- Facilities permanently ceasing operation;
- Job impacts;
- Average annual price of RTCs;
- Availability of RTCs;
- Toxic risk reductions;
- New Source Review permitting activity;
- Compliance issues, including facilities not meeting their annual cap;
- Emission trends and seasonal fluctuations;
- Emission control impacts on RECLAIM and non-RECLAIM sources; and
- Emissions associated with equipment breakdowns.

In addition, annual audits also review the effectiveness of enforcement and protocols. The District also conducted a comprehensive audit of the first three years of the program to evaluate the overall performance of RECLAIM against the following criteria:

- RECLAIM has produced the emission reductions required;
- RECLAIM has resulted in significant reduction to public health exposure to criteria air pollution and no significant increase in exposure to toxics;
- RECLAIM has not accelerated business shutdowns, job loss or shifts in the occupational structure of the region;
- The price of credits and trading activity demonstrates adequate supply and demand;
- Emission monitoring, recordkeeping, and penalty provisions have produced a strong compliance program and adequate deterrence of violations;
- RECLAIM is consistent with the provisions of the Federal and State Clean Air Acts (CAA);

- The emission factors used for allocations are consistent with any recent technology advancements;
- There have not been disproportionate impacts in terms of emission reductions for RECLAIM sources compared to sources that are not in RECLAIM;
- Whether RECLAIM should include mobile, area, and more stationary sources; and
- Control technology has advanced as much as projected under the AQMP.

Each audit is discussed at an AQMD Governing Board meeting as a public hearing item.

Periodic Assessments of BARCT

State law requires the District to periodically review the program to evaluate if additional allocation reductions are warranted to reflect advances in BARCT. The first such evaluation resulted in rule amendments in January 2005 to reduce the overall NO_x credits by over 20 percent (7.8 tons per day) by 2011.

An extensive evaluation was undertaken for each of the major categories of equipment in the program. Staff evaluated what controls or changes had been implemented by RECLAIM and non-RECLAIM facility operators, what rules are in place by any other local air district or state, and what technologies had been employed. Cost-effectiveness was also a consideration, as some districts had rules with lower emission limits than the rules subsumed by RECLAIM. However, the equipment covered was less controlled than the starting universe in RECLAIM, so the incremental reductions would not be cost-effective in RECLAIM. Another criteria that staff evaluated was whether a rule would be pursued in the absence of our cap-and-trade program. The evaluation resulted in rule amendments with nineteen categories identified with new BARCT levels. Emission reductions will be realized by applying an equal reduction to all allocations or RTC holdings from 2007 to 2011.

A review for SO_x BARCT is currently underway for potential rule amendments in 2008. Future credit programs should consider similar periodic technology reviews and additional reductions.

Chapter Three - Legal Issues

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Design Features

Introduction

Summary

Legal issues relative to RECLAIM that may be applicable to designing other future cap-and-trade programs include: what provisions are necessary to ensure that the program is enforceable; and how to ensure that program allowances or credits do not create a property right that would prevent government actions to reduce the number of credits available or to suspend or terminate any credits. In addition, in designing RECLAIM, the District had to take into consideration the requirements of the Federal CAA, as well as specific requirements of state law that were adopted to guide the design of market incentive programs. Finally, the District developed mobile source and area source credit programs, which presented their own legal issues.

Federal and State Air Quality Requirements

The Federal CAA requires the Environmental Protection Agency (EPA) to identify air pollutants, the emissions of which cause or contribute to pollution which may reasonably be anticipated to endanger public health or welfare. (CAA § 108; 42 U.S.C. § 7408). EPA must then establish national ambient air quality standards for such pollutants. Primary standards must be set at levels requisite to protect public health, allowing an adequate margin of safety. Secondary standards shall be set at levels requisite to protect the public welfare from any known or anticipated adverse effects associated with the presence of the pollutant in the ambient air (CAA § 109; 42 U.S.C. § 7409). Once EPA sets the ambient air quality standards, states are required to adopt and enforce plans to attain and maintain the standards. Such plans must include enforceable emissions limitations and other control measures as necessary to meet the requirements of the CAA (CAA § 110; 42 U.S.C. § 7410). In addition, the CAA contains numerous specific requirements for controls to be included in the state implementation plan, some of which are specific to individual pollutants. This paper discusses Clean Air Act

requirements that are of special concern under a cap-and-trade program, either because they need to be applied differently from how they are applied under a command-and-control regime, or because they remain applicable directly to sources under a cap-and-trade program, and cannot be modified, such as lowest achievable emission rate (LAER) or new source performance standards (NSPS).

State law also imposes specific requirements applicable to market-based incentive programs. In 1992, the Legislature enacted AB 1054 (Sher), now codified at Health & Safety Code § 39616. This statute applies to programs which are an element of a “district’s plan for attainment of the state or federal ambient air quality standards” (Section 39616(b)(1)). The statute requires a market-based program to meet a number of specific requirements in comparison to the command-and-control rules in effect or which otherwise would have been adopted. It requires the District Governing Board to make findings, supported by substantiating information, that the program will result in an equivalent or greater reduction in emissions at equivalent or less cost, that the program will result in comparable levels of enforcement, and several other requirements. This statute was very useful in defining specific benchmarks that the program must meet in order to assure no adverse effects resulted from switching from a command-and-control program to a cap-and-trade program. This statute also called for a reassessment of the program within seven years to assure that the program still meets the statutory goals. Finally, the statute calls for a program reassessment if the cost of emission trading units exceeds a level predetermined by the District Governing Board.

Enforcement Issues

Enforcement issues were key to all stakeholders in the RECLAIM development process. The District and EPA were especially concerned to assure that the program provided adequate deterrence to prevent widespread violations, that the elements of a violation were clear, and that the program was designed so that violations could be prosecuted as effectively as under traditional command-and-control rules. Environmental groups, besides being interested in enforcement generally, supported program elements that would make compliance data available to members of the public. Industry representatives wanted to assure that compliance elements of the program did not present an undue economic burden.

Special enforcement challenges are presented by a cap-and-trade program under which compliance is no longer measured instantaneously by a concentration throughput, or emission limit. Instead, under RECLAIM, compliance was to be measured over a significant period of time--ultimately determined to be quarterly—and individual sources no longer had to comply with specific rule or permit condition limits. Compliance would be measured and reported by looking at the total mass emissions of the RECLAIM pollutant from the entire facility, measured over a daily, weekly, or quarterly period depending on the emissions potential of the individual equipment. This design feature necessitated the requirement for sophisticated pollution measuring and monitoring methods, which are discussed in a separate section. This section discusses the legal aspects of the program design that enhanced enforceability.

Credits Not Intended to Create Property Rights

As in the case of the acid rain trading program established under the 1990 Amendments to the Clean Air Act, the District and EPA wanted to make sure that by establishing a system of allowances or credits, which could be bought and sold in the open market, the District was not creating any kind of property right which would prevent the District from amending the rules,

Allocations or credits are not a property right

reducing allocations, or suspending or terminating credits. Indeed, the District needed the flexibility to abolish the program altogether if it was deemed not to be working. The District researched how to avoid creating a property right in the RECLAIM credits, and designed the program rules to make sure that such a right was not created.

Mobile Source Credits

While RECLAIM was originally designed to allow trading of mobile source credits into the program, EPA never approved any of the District's early mobile source credit rules. As a result, RECLAIM facilities declined to use these credits, because they could be sued under the Clean Air Act. Not until the energy crisis of 2001 were the District and EPA able to develop federally-approvable "pilot" mobile source credit rules. These rules included "sunset" provisions, generally five years from adoption. EPA also insisted on detailed monitoring, recordkeeping, and reporting requirements, as well as enforcement programs making the credit user as well as the credit generator, liable for any shortfalls.

Federal Clean Air Act Compliance

Reasonably Available Control Technology

Under the Federal CAA, states are required to submit to EPA plans which provide for the attainment and maintenance of the national primary ambient air quality standards. (CAA §110(a)(1), 42

RACT may be met on an aggregate basis

U.S.C. §7410(a)(1).) These plans are required to provide for the implementation of all reasonably available control measures as expeditiously as practicable, including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of Reasonably Available Control Technologies (RACT). (CAA §172(c)(1); 42 U.S.C. §7502(c)(1).)

Under traditional command-and-control regulatory systems, RACT is generally established as an emissions limit applicable to each class or category of source, and potentially even on a source-specific basis. Under RECLAIM, however, it was proposed that individual sources would no longer be subject to specific emission limits; instead the entire facility would be subject to a mass emissions cap. Thus, the District needed to determine how RACT would apply under a cap-and-trade program.

The District consulted with EPA, and received a response in February 1992. EPA concluded that RACT may be met on an aggregate basis. In other words, RACT requirements would be deemed met if total emissions from sources subject to RACT did not exceed total emissions that would have occurred if RACT had been applied to specific sources. (RACT sources are defined by EPA as major sources and any sources for which EPA has established a “control techniques guideline” as authorized under the CAA.) EPA also advised that RACT sources may be included in an emissions “bubble” with sources that are not subject to RACT, such as mobile and area sources. However, RACT levels of emissions must be met within the universe of sources subject to RACT, without taking credit for reductions from non-RACT sources.

New Source Review Requirements

Under the Clean Air Act, new and modified major sources are subject to a requirement for emission reductions (offsets) which will be sufficient, together with other reductions in the area,

so as to represent reasonable further progress toward attainment (CAA §173(a)(1)(A); 42 U.S.C. §7503(a)(1)(A).). Under the 1990 amendments to the CAA, specific offset ratios are set depending on the area's ozone nonattainment status (CAA §182; 42 U.S.C. §7511a.). EPA explained that the Federal CAA does not require the necessary offsets to be provided by the individual new or modified source. Thus, offsets may be provided in the aggregate. However, EPA advised that section 173(c)(2) of the CAA limits offsets to emission reductions not "otherwise required by this Act." (42 U.S.C. §7503(c)(2).)

Also under the Clean Air Act, new and modified major sources must meet an emissions limit which is the LAER. (CAA §173(a)(2); 42 U.S.C. §7503(a)(2).) LAER is defined as the lower of either (1) the most stringent limit which is contained in the implementation plan of any state for such class or category of source, unless the source demonstrates that such limits are not achievable, or (2) the most stringent limit achieved in practice by such class or category of source. The District established the program so as to require that LAER be met for each new or modified source, and did not allow this requirement to be met on an aggregate basis.

Credit Availability

Under EPA's traditional guidance, all credits, which would include RECLAIM credits, must be quantifiable, surplus, enforceable, and permanent. In the context of RECLAIM, the concept of "permanence" needed to be considered in light of the specific structure of the program. The program was designed with a declining cap, meaning that each year, a facility's allocation would be reduced from the year before, until the program end point. For example, if a facility had 100 pounds of credit the first year, it might have 95 pounds the second year. As a result, credits could not be issued in the form of an authorization to emit a specific amount for an infinite time into the future, as with a traditional credit. Instead, credits were designed to represent the

Credits must be quantifiable, surplus, enforceable and permanent

authorization to emit a discrete pound of emissions, but that pound could be emitted at any time during a

particular compliance year. Each credit was defined to be only good for that one year period.

The possibility of "banking" credits was discussed. However, it was decided that this would present too great a risk of facilities "hoarding" unneeded credits in the earlier years, to be used in later years when allocations were to be reduced, thus threatening progress towards attainment.

Other Federal Requirements

EPA also advised the District that the Clean Air Act would allow the program to employ a mass emissions limit which is based upon a cumulative total over a longer period than one day.

Ultimately, the period of cumulation for the mass cap was established at one quarter (3 months). However, EPA stated that it would have to be satisfied that this longer averaging period would produce equivalent emission reductions on a daily basis so as to satisfy RACT, and that the program would not result in large numbers of sources increasing their emissions all on one day, thus risking causing violations of the ozone standard.

The District designed the program so that individual sources or permit units were not relieved from their responsibility to comply with Federal NSPS affecting RECLAIM pollutants, since these standards are specifically required by the CAA. Of course, RECLAIM does not relieve sources from the responsibility to comply with rules applicable to non-RECLAIM pollutants, such as air toxics rules.

State Law Applicable to Market-Based Incentive Programs

Introduction

During the period when the District was conducting its feasibility studies for the implementation of a marketable permits program, there was some concern that a market-based program could result in unintended adverse effects on the environment, covered facilities, or workers. As a

*Set up benchmarks to monitor
program performance*

result, the legislature enacted AB 1054 (Sher), now codified as Health and Safety Code section 39616, which required the District Governing Board to make seven specified findings, and present information to substantiate the basis for the findings to CARB, which was required to ratify those findings in approving the program. While this statute appears to be limited to district programs that are part of the plan for attainment of state or federal ambient air quality standards, it provides some benchmarks that may be useful in the design of any future cap-and-trade programs.

Equivalent Emission Reductions

First and most important, the program must result in equivalent or greater emission reductions at equivalent or less cost compared to command-and-control rules in effect or which otherwise would have been adopted. To make this finding required determining what were the measures that would otherwise have been adopted. To do this, the District looked at its 1991 AQMP, which specified measures to be adopted in the future. Also, it was not possible to directly compare the emissions from each category of source under RECLAIM compared to under the AQMP, because a fundamental design feature of RECLAIM was that individual sources or permit units would no longer be subject to specific emission limits. Instead, compliance would be measured on a facility-wide basis, and measured on a mass basis rather than by looking at the emissions rate. Therefore, to make the comparison, the District calculated a projected emissions reduction line for the entire RECLAIM universe of sources which would be expected to occur under the AQMP. Then, the total of RECLAIM allocations were compared with the projected future AQMP emission levels, and RECLAIM was designed to match those levels.

One issue presented in this comparison is the fact that the AQMP projected emission levels were dependent on a specific forecast of growth. If growth turned out to be less than projected, emissions under the AQMP would be less than projected.

If growth were greater than projected, emissions under the

A cap-and-trade program protects the environment from unanticipated growth

AQMP could exceed the projected emission reduction line. (In fact, that is one of the key advantages of RECLAIM: it imposes a mass emissions cap which must be met regardless of growth, whereas command-and-control rules limit emissions rates but do not limit total mass emissions.) In order to deal with this uncertainty, it was decided to always measure RECLAIM emissions against the AQMP projected emissions, regardless of the actual rate of growth.

In addition to requiring equivalent emission reductions, the law required that RECLAIM produce those reductions at equivalent or less cost than would otherwise occur under command-and-control. In order to make this finding, the District projected the costs of compliance with command-and-control rules into the future, and then developed an economic trading model, designed to predict the costs of RECLAIM into the future. A limitation of this analysis was that the RECLAIM program actually was designed to continue for a considerable time into the future,

requiring emission reductions beyond those that would result from the application of known technologies. As a result, the model could not predict the costs of compliance using such future unknown technologies. Therefore, the District based its comparison on the costs of known technologies only. Because RECLAIM was designed to incentivize the use of the most cost-effective technologies first, the analysis demonstrated equivalent or less costs for the period covered by the analysis.

Equivalent Enforcement

Nearly as important as progress towards attainment was the requirement for a finding that the program would provide a level of enforcement and monitoring that was comparable with command-and-control measures that would otherwise have been adopted. As is discussed elsewhere in this paper, RECLAIM requires the use of detailed recordkeeping and sophisticated

Programs based on mass emissions must have adequate resources for enforcement

monitoring equipment capable of continuously measuring emissions at the largest sources. The

economic model predicted that the additional costs of such monitoring would be more than offset by the savings due to employing the most cost-effective controls first. From the point of view of the facility, additional monitoring was the price to be paid for the additional flexibility offered by the program. However, from the point of view of the District staff, an unanticipated consequence of RECLAIM was the enormous amount of resources it takes to adequately monitor and enforce compliance. Auditing of various reports and records became equally important as field enforcement. Auditing each facility could take weeks. Any program based on mass emissions needs to take into account the resource needs for adequate enforcement under this new method of measuring compliance.

Allocation Equity

AB 1054 required the District to assure that the program would provide a baseline methodology that gives credit to sources that have reduced their emissions prior to program implementation.

The District accounted for this requirement by basing facility allocations on the facility's highest level of emissions during the

How to deal equitably with early reductions is a key issue

most recent five years (adjusted for rule requirements going into effect in the interim). Thus, if a facility had voluntarily reduced its emissions in that time, it would still get the benefit of a higher

allocation. This feature also accounted for the fact that there was a recession going on when the program was started, so lower recessionary levels of economic activity were not locked into the program. How to treat sources with pre-program “early reductions” would be a key issue in designing any cap-and-trade program which is based on total mass emissions.

Socioeconomic Impacts

The District was also required to make a finding that the program would not result in a greater loss of jobs, or more significant shifts from higher to lower skilled jobs, on an overall district wide basis, than that which would exist under command-and-control. As the program has continued, the District has annually determined the job losses attributable to RECLAIM, and has seen negligible impact.

AB 1054 required that the program not result in disproportionate impacts, measured on an aggregate basis, on stationary sources included in the program compared with permitted sources outside the program. The District’s socioeconomic analysis demonstrated compliance with this requirement. In subsequent litigation brought by the metal-melting industry, the court ruled that the district’s socioeconomic analysis was required to predict effects only to the extent that data were available. The fact that the District could not foresee all effects of the program into the far future did not mean the District could not adopt the program.

Other State Law Issues

The law required the program to promote the privatization of compliance and the availability of data in computer format, and required the District to endeavor to allow facilities to keep electronic or computer records rather than mechanical records such as strip charts. A key part of RECLAIM was the computerization of recordkeeping and reporting. Indeed, the largest sources report their emissions directly to the District through electronic means.

The District was required to determine that the program did not delay, postpone, or hinder compliance with the California Clean Air Act, requiring all feasible measures to be adopted in efforts to attain the state ambient air quality standards. In addition to looking at total emission reductions, as in the first finding, this finding required the District to assure that the program met the specific population exposure reduction requirements of the California Clean Air Act.

Initially, this finding was supported by modeled projections of future emissions and exposure levels. Over time, it resulted that exposures were reduced much more rapidly than required by the California Clean Air Act.

Program Reassessment

AB 1054 required the above findings to be made as of program adoption. Thus, the initial findings were necessarily based on projections into the future. Therefore, AB 1054 also required a retrospective look at the program, by requiring the initial findings to be ratified within seven years of initiation of the program. If the District was unable to ratify these findings, it was to make any necessary adjustments to the program.

Finally, the law required the District to reassess the program if the price of credits exceeded a predetermined level, which the Board established at \$25,000 per ton. The Board has also established a \$15,000 per ton price level at which the staff would be required to conduct an evaluation of the compliance and enforcement aspects of RECLAIM, and propose any recommended amendments to the program necessary to maintain enforceability. That price was based on the predicted cost of installing control technology. The statute does not give any guidance as to what aspects of the program need to be reassessed, but leaves that decision to the discretion of the Board. In the past, credit prices exceeded this level only during the energy crisis, when dramatically higher activity levels at power plants (and resulting higher emissions levels), caused prices to rapidly spike. The District responded by temporarily removing power plants from the RECLAIM credit market, allowing them to mitigate their emissions exceeding their available credits by paying mitigation fees which were used to reduce emissions from other sources, such as mobile sources and agricultural equipment. In addition, the District required power plants to install additional controls, in a sort of “hybrid” approach with a command-and-control element overlaid over the market-based program. The District found this necessary because facilities did not foresee that the program was reaching a “crossover point” (at which emissions would equal or exceed allocations) in sufficient time to install controls. To assure that future planning was adequate, the District also required the largest facilities in the RECLAIM program to file a demonstration regarding how they would comply in the future by using either RECLAIM credits or by installing emission control technology.

Enforceability Issues

Enforceability of Trades

EPA played an active role in the District's consideration of enforcement issues relative to RECLAIM. Relative to RECLAIM credits, EPA advised that the District should make sure that the District maintained accurate, reliable information regarding the issuance and trading of credits. Other stakeholders also had an interest in such accurate information being available, since they needed to be able to rely on such information to conduct their trading activity. The District adopted several measures to facilitate accurate data gathering. First, the rules provided that the District's records were the "official and controlling record" of RECLAIM trading credit status and trades. No trade could occur without being registered with the District. Also, the District required both the seller and the buyer to jointly file the registration of an RTC. As a result, no one could attempt to trade a credit without the seller's knowledge.

To assure that trades could be carried out, the rules require that the amount traded be debited from the seller's account before a transfer could be registered. Thus, if insufficient credits are available, the trade can not be registered and would have no legal effect. While state law already

Accurate, well documented emission tracking information is key to program integrity

prohibits falsification of documents required by District rules, the RECLAIM rules went further

by prohibiting the making of any false statement in connection with a proposed or actual credit transaction. Thus, if a person falsely represented to a buyer that he owned credits, he could be prosecuted even though no statements were ever made to a District representative. Finally, even though the actual transfer of credits was not to occur until a point in the future, the District required parties to report forward or contingent contracts within five days of their execution. This provision, added later during the program's implementation, was designed to help parties understand the true status of the market and current prices.

Sufficiency of Penalties

The fact that program compliance was measured on a quarterly basis also presented enforcement issues. If it were held that there could only be one violation of the emissions cap per quarter,

then the maximum penalty for a single violation would be inadequate to deter future intentional violations. Thus EPA insisted that the cap be defined in such a way as to assure there would be an adequate number of source-days of violation to provide deterrent value. The District addressed this by providing in the rules that a violation would occur for each and every day in any year in which an exceedance of the cap occurred, except to the extent that a facility was able to prove that on any particular day or days, the cap had not been exceeded. The burden was placed on the facility to make that demonstration; otherwise 365 violations would be presumed.

In addition, it was recognized that it would be possible for a facility to have very large exceedances occurring on only a few days at the end of the accounting period, and that the maximum daily penalty might not in such cases provide sufficient deterrence. Therefore, the District rules provided that in addition to the daily violations, there would be an additional violation for every 1000 pounds of emissions exceeding the cap. It was also recognized that as RTC prices rose, existing penalties might no longer be sufficient. Thus, the rules provided that if the average price of RTCs exceeded \$8,000 per ton, there would be an additional violation for every 500 lbs of exceedance.

As noted earlier, accurate facility monitoring, recordkeeping, and reporting is far more important under a mass cap program than under command-and-control, because it is impossible to

Different penalty provisions are needed for a cap-and-trade program

determine compliance by a simple inspection or source test. Therefore, the rules provided for penalties for

submitting inaccurate reports. As in the case of the mass cap exceedance, one violation per quarterly report was not considered sufficient, so the rules provided that there would be a violation for each day in the quarter for which an inaccurate report was filed.

Additional Remedies for Violations

In addition to civil and criminal penalties for violations, the program was designed to provide further deterrence to exceeding the cap, as well as to include features to “make the environment whole” following a violation. The most important of these was the provision that if a facility exceeded its cap, the amount of the exceedance would be deducted from the facility’s allocation for the year following the determination of exceedance. This would provide a direct economic impact on the facility, requiring it to “make up for” the exceedance by buying future year credits.

It also meant that total available RTCs, and thus potential emissions, would be reduced by the amount of the exceedance.

The rules also provided that the District could impose additional conditions on the facility permit which are deemed necessary to prevent future violations. Pursuant to existing rules, such conditions could be appealed to the District Hearing Board. The rules also allowed the District to petition the Hearing Board to actually revoke a facility's permit for violation of the cap. This is a drastic remedy which was expected to be reserved for deliberate and recalcitrant violators. Finally, the rules provided for an administrative penalty of \$500 per day of violation. This could be imposed only after giving the facility a due process opportunity for administrative hearing. This remedy has not been used, since it has turned out that the small violations for which it was designed can be adequately handled by the civil settlement process for a small penalty.

Variance and Breakdown Provisions

One key aspect in which the RECLAIM program differs from a command-and-control rule is that the rules provided that no variance could be obtained from the requirement to comply with the mass cap. This provision was also added into state law. For other district rules, a facility may obtain a variance, or permission to violate a district rule for a limited time, if the violation is due to conditions beyond its reasonable control, and other specified findings are made by the Hearing Board. This provision would have created an enormous loophole, preventing the program from reaching its objectives of reducing mass emissions year-by-year. And it was considered unnecessary, since in the absence of specific control technology requirements, a facility can always comply by either purchasing credits or reducing operations.

Variances from the cap should not be allowed

One flexibility provision was included in the rules, which allows a facility to exclude emissions occurring during a breakdown from its cap if the facility complies with breakdown rules. EPA later concluded that this provision potentially threatened the program's emission reduction objectives. Rather than delete this flexibility, the District revised the rules to require staff to account for all such emissions at the end of the compliance year, and if they exceeded the "compliance margin" (amount by which available RTCs exceeded emissions) then the excess emissions would be deducted from those facilities that had emissions excluded due to a

breakdown or would be made up by RTCs, which are valid for the next compliance year and obtained by the District. So far, emissions have always been substantially under allocations, except during the power crisis.

Missing Data Provisions

Because accurate emissions monitoring was so important, it was necessary to design the program so as to ensure adequate incentives for installing and properly operating monitoring equipment.

Missing data provisions are needed for cases where monitoring equipment is not working

Also, it was necessary to devise some method of accounting for any unrecorded emissions

occurring when monitoring equipment was not operating, to determine whether the cap had been violated. These two problems were handled by the so-called “missing data” provisions. Under these provisions, for periods of time when monitoring equipment was not operating properly, the facility was required to report emissions at the highest level that had previously been monitored. If there was no prior data, such as before required equipment was installed, emissions were required to be reported based on an assumption that the equipment was operated at its maximum rated capacity, at 100% activity level, and using uncontrolled emission factors.

These assumptions were considered environmentally protective, since they would be assuming the “worst-case” in terms of potential emissions from the source. In addition, since the facility would have to offset such assumed emissions with RTCs, which cost money, the missing data provisions created a significant incentive to timely install the required equipment and keep it operating properly at all times. However, facilities were very unhappy with these provisions, especially in the early years if monitoring equipment had not been timely installed, and the worst-case assumptions applied. In order to assure that the missing data procedures worked as designed, the rules provided that there could be no variance from these procedures.

Out-of-State Traders

Just recently, a novel enforcement issue was presented when a purchaser from outside the U.S. applied to register a trade. Staff was concerned with the difficulty of carrying out an enforcement action against a rule violator located in the Isle of Man. As a result, the proposed purchaser was required to designate a

Enforcement provisions for out-of-state or out-of-the country traders are needed

California agent for service of process, the designation to be effective for at least four years after the trade, and to stipulate to jurisdiction and venue in the Superior Court of Los Angeles County. These provisions have been added to the rules for all out-of-state traders. If future cap-and-trade programs include foreign or even out-of-state participation, care will need to be taken to ensure enforceability over those participants. This problem is less severe in RECLAIM than it might be for other markets, since ultimately a RECLAIM credit must be used in the RECLAIM universe of facilities, and is worthless if not so used, so the program provides a built-in incentive to continue complying with RECLAIM trading provisions.

RECLAIM Trading Credits Were Not to Create a Property Right

Introduction

Since RTCs were intended to be bought and sold, in order to facilitate compliance with the cap, they were obviously intended to have monetary value. However, the District and EPA needed to be able to amend the program in the future so as to reduce the total credits available, or to suspend or terminate credits. Indeed, it was necessary to retain the flexibility to abandon the program altogether if it was not working satisfactorily and return to a command-and-control system. Therefore, it was necessary to assure that in creating RTCs, the District did not create a property right which would require compensation in the event that regulatory actions reducing or removing their value occurred. Both state and federal laws dealing with credits address these issues to some extent.

Allowances or credits are not a property right

State and Federal Legal Background

The state Health and Safety Code does not contain provisions dealing with the nature of credits under a mass cap program, but it does contain general provisions requiring the districts to create credits which may be banked and used to offset future increases in emissions. The statute specifically provides that “the system is not designed to recognize any preexisting right to emit air contaminants...” (H&S section 40709). Furthermore, section 40710 provides that “certificates evidencing ownership of approved reductions issued by a district shall not constitute

instruments, securities, or any other form of property.” However, the law does appear to recognize the right to “own” such credits.

In contrast, the Federal CAA does not discuss the nature of emission reduction credits traditionally used as offsets for increased emissions from new or modified stationary sources. However, it explicitly deals with the status of allowances issued under the federal Acid Rain program established pursuant to the 1990 Amendments. As stated in section 403(f), (42 U.S.C. section 7651b(f)), “an allowance allocated under this subchapter is a limited authorization to emit sulfur dioxide in accordance with the provisions of this subchapter. Such allowance does not constitute a property right.” And under Title V, although the Clean Air Act itself does not speak to the issue, the EPA regulations require that every Title V permit contain a provision specifying that the Title V permit does not convey any property rights (40 C.F.R. section 70.6).

Supreme Court Precedent and Design of Rules

Under Supreme Court rulings, the existence of a property right normally depends on the terms of applicable state laws. (*Board of Regents v Roth*, 408 U.S. 564, 577 (1972).) The Court has also set forth the proposition that a compensable property right is not involuntarily created when government makes clear in a statute that it does not intend to create a property right (*United States v. Fuller*, 409 U.S. 488 (1973)). Also, language expressly reserving the right to repeal or amend the law in question militates against the creation of a property right (*Bowen v. Public Agencies Opposed to Social Security Entrapment*, 477 U.S. 41 (1986)). The District kept these precedents in mind in drafting regulatory language for the RECLAIM program.

First, the RTC is defined in a manner similar to the allowance under the federal Acid Rain program. An RTC is defined in Rule 2001 as “a limited authorization to emit a RECLAIM pollutant in accordance with the restrictions and requirements of District rules and state and federal law.” Second, the District explicitly reserved the right to amend the program or revise credits. Under Rule 2007, the District reserves the right to amend the rules, and specifically states that nothing in the rules limits the District’s right to condition, limit, suspend, or terminate RTCs, or the authorization to emit represented by the facility permit. Finally, Rule 2007 expressly disclaims any intent to create a property right. The rule specifies that an RTC shall not “constitute a security or any other form of property,” but it may be used as collateral or security

for indebtedness. If future cap-and-trade programs are created, similar provisions should be included in the rules to protect the government's right to amend the program in the future.

Incorporating Mobile Source Credits

Background

As originally adopted, RECLAIM included provisions for including credits generated by reductions from mobile sources into the trading program. This was consistent with state law, H & S § 40440.1, which was also adopted in 1992 as part of AB 1054. That section provides for allowing trading of “quantifiable reductions in emissions from a significant number of different sources, including mobile, area, and stationary...”

When RECLAIM was adopted, the District's only mobile source credit rule was Rule 1610, allowing generation of credits from scrapping older, dirtier passenger vehicles. Subsequently, the District adopted Rule 1612, allowing the generation of credits from the use of low-emission vehicles that generates reductions beyond those required by law; Rule 1613 (credits for truck

All credit programs must be federally approved if the program is subject to the CAA

stop electrification); Rule 1620 (credits for clean, off-road mobile equipment); and Rule

1623 (credit for clean lawn & garden equipment). Unfortunately, none of these rules were ever approved by EPA into the state implementation plan required by law (SIP). When a rule is federally enforceable, besides EPA enforcement, any member of the public can sue a facility violating that rule. The federally-approved version of RECLAIM did not include the original mobile source credit rules. Accordingly, certain environmental groups sued some facilities that were using mobile source credits for violating the SIP-approved version of RECLAIM. The net result of these lawsuits was that RECLAIM facilities were unwilling to take the risk of using mobile source credits.

Pilot Credit Generation Rules

During the California energy crisis beginning in the year 2000, District staff worked with EPA to develop approvable mobile source credit rules, based on the urgent need to increase credit supply because power plants had greatly increased their consumption of credits, driving up credit prices dramatically. EPA was only willing to consider “pilot” rules that would “sunset” in five years.

Eventually, the District adopted and EPA approved “pilot” credit-generation rules for heavy-duty captive vehicles (Rule 1612.1), repowering of diesel fueled marine vessels (Rule 1631), use of shore power by marine vessels at berth instead of diesel powered auxiliary engines (Rule 1632), electrification of truck/trailer refrigeration units (Rule 1633), and truck stop electrification (Rule 1634). Rule 2507, credit generation for agricultural equipment, was also adopted.

“Surplus” Requirement

EPA’s concerns regarding mobile source credits were basically three-fold. First, the credits had to be “surplus,” meaning that the reductions had to go beyond any reductions required by an applicable law. EPA was concerned that CARB or EPA might adopt rules in the

The program must include a determination whether to allow credits for reductions resulting from other laws

future that would require the kinds of reductions for which the rules allowed credits. To prevent this, EPA insisted that the rules contain a “sunset” provision whereby District, CARB and EPA would evaluate each source category and determine whether the reductions called for by the rules remained “surplus.” If the evaluation was not performed, or the evaluation determined that credits were no longer surplus, the issuance of credits would be suspended.

Enforcement Programs

EPA also included specific requirements for enforcement, above and beyond the availability of civil and criminal penalties for violation of the rules. If there were any shortfall in the generation of credits, the applicant must make it up by providing compensatory RTCs or mobile source credits. Importantly, if the credit generator failed to do so, the credit user became responsible for making up the shortfall. This provision was necessary because under the pilot rules, credits were issued before the reductions were actually generated, upon approval of the plan for generation.

Mobile source credit programs present enforcement and design challenges

Each rule also contained extensive monitoring, recordkeeping, and reporting requirements to assure that any credits issued were real and quantifiable. For sources that are not “captive,” such as marine vessels, extensive provisions to assure that the emission reductions credited actually occurred within the District were included in the rules. In the case of marine vessels, they were

required to install global positioning systems, which monitor the vessel's location. The rules all included a 10% discount of each credit, to be retired for the benefit of the environment. The rules only authorized the issuance of NO_x credits. (Other pollutant reductions were to be retired for the benefit of the environment.) Finally, the credits could only be used in RECLAIM, not for traditional stationary source NSR offsets, and not in lieu of compliance with any other rules.

Applicability to Future Trading Programs

In designing a mobile source element of a trading program, it likely will be necessary to include detailed, enforceable monitoring, recordkeeping and reporting requirements to assure that such credits are real and quantifiable. The program design will need to determine whether to grant credits to reductions that are not specifically required by the program, but which are the result of changes required by other laws, such as criteria pollutant control programs. Also, the program rules will need to specify whether all credits must result from reductions accruing within California. If so, provisions for assuring this occurs, such as GPS systems, may be required.

Prosecution Experience

Design Considerations

The design considerations for successful prosecution of RECLAIM violations centered on three objectives: (1) presumptions regarding missing data and violation time periods should favor the environment and government; (2) issues arising from inconclusive evidence should be preempted by imposing on the violator the burden to demonstrate compliance for all times relevant to the enforcement case; and (3) certification of data and reports should facilitate the admissibility of RECLAIM documents in civil penalty prosecutions and provide flexibility for prosecuting false statements.

Presumptions and Burdens

Four critical presumptions favoring the government were built into the enforcement design of the program. First, in the event of monitoring failures, missing data provisions were included to provide a default worst case calculation for curing gaps in the recording and submittal of quarterly or annual emissions data. These provisions ensure that the violator, not the

environment, bears the consequences of missing data. Second, in the event that a facility violates the prohibition of emissions in excess of the facility's quarterly or annual allocation, there is a presumption that the facility is in violation for each day of the compliance year (365 days). The burden falls on the violator to establish the number of days, or such lesser period as can be established, that the cumulative facility emissions were less than the annual emission allocation. Third, in the event that an inaccurate (and uncorrected) quarterly certification of emissions is submitted, there is – in effect – an irrefutable presumption that each day in the quarter constitutes a single, separate violation. And fourth, in the event that a facility exceeds a concentration limit, as established by a source test, the days of violation are presumed to include the date of the source test and each and every day thereafter until the facility establishes that continuous compliance has been achieved.

Admissibility and Enforcement Flexibility

In the RECLAIM program, various documents, such as quarterly and annual emission reports, require certification for accuracy by the highest ranking facility official with responsibility for the subject matter of the certification. This certification requirement provides evidentiary advantages and enforcement flexibility – all of which enhances the government's ability to

Requiring data and reports to be certified for accuracy facilitates admissibility at trial, and provides enforcement flexibility

successfully prosecute RECLAIM violators.

Relative to evidentiary advantages, the requirement to certify documents helps to identify the person

ultimately responsible for the accuracy of the document; it helps to lay the foundation for the introduction of the document by unambiguously identifying its business purpose; and it helps to introduce evidence of the absence of a document by showing that an individual or facility would be expected to have prepared such a document. Relative to enforcement flexibility, the certification requirement enhances options for both civil and criminal prosecution for false statements by easing the burden to prove intent and materiality -- key elements for either civil or criminal prosecution.

Certification requirements provide several advantages when introducing documents as evidence in enforcement proceedings. First, the signature requirement helps to identify the person ultimately responsible for the

Evidentiary presumptions and burdens favoring the government are essential for successful prosecution of violations

accuracy of the information in the document. This helps in identifying the individuals to depose or call at trial regarding a certain document. Second, certification also helps lay the foundation for introduction of the document by unambiguously identifying its business purpose. It is also easier to introduce evidence of the *absence* of a document that must be certified and submitted by showing that an individual or company would be expected to have prepared such a document (Cal. Evid. Code 1272). Third, the certification requirement helps overcome a hearsay objection by establishing that a certified document is a particularly trustworthy business record because, when there is a punishment for inaccurate information in a document, an individual will be expected to use more care in its preparation (Cal. Evid. Code 1271).

Lessons Learned

- It is important to understand which federal and state laws apply.
- Programs based on mass emissions must have adequate resources for enforcement.
- The program must include a determination whether to allow credits for reductions resulting from other laws or programs.
- Enforcement provisions for out-of-state or out-of-country traders are needed.
- Mobile source credit programs present unique design and implementation challenges.
- Variances from the annual cap should not be allowed.
- Missing data provisions are needed for cases where monitoring equipment is not working.
- Evidentiary presumptions and burdens favoring the government are essential for successful prosecution of violations.
- Requiring data and reports to be certified for accuracy facilitates admissibility at trial, and provide enforcement flexibility for false statements.

Chapter Four – Establishing Baselines and Reduction Targets

Author: Jill Whynot

One of the most difficult and contentious parts of RECLAIM development was establishing the initial allocations and the reductions required programmatically and at the facility level.

Determining a fair, equitable formula that recognized early reductions and did not overly restrict a facility's ability to rebound from the economic recession was very resource intensive and controversial.

Setting allocations is extremely controversial

Many different conceptual designs were explored, and when stakeholders agreed in principle to an approach, that sentiment often changed when details were provided about what that particular method translated to on a facility-specific basis.

The District went with a facility-specific reduction approach, which addressed some of the equity issues, but took significant resources to develop and implement. Staff spent hundreds of hours

Make sure that the overall program targets are met for key years

determining what emission factors per specific equipment were appropriate for the program start point, and what

emission factors should be used for anchoring the end point for the year 2000. Ultimately, the rules allowed facilities to choose a peak production year from 1989 to 1992 for the 1994 allocations, and a peak year from 1987 to 1992 for the year 2000 allocation. The peak production throughput was applied with the specific emission factor for each piece of equipment, and then the mass total became the basis for the facility 1994 allocation.

A similar approach was used for the 2000 facility allocations, however, the sum of each facility allocation was larger than the projected actual emissions in the 1991 AQMP for the year 2000. To bring the total in line with the AQMP, all facilities had a small percentage decrease applied to the sum that was calculated for them. From 2000 to 2003, the 1991 AQMP projected additional emission reductions, largely based on a control measure that had a fifty percent reduction from all combustion equipment. Since the details were not available on which equipment would reduce, and at what rate, each facility shared equally in the overall reduction from 2000 to 2003. Where facilities generated and held existing ERCs, those ERCs were converted to additional RTCs and added to allocations.

There was an extensive process that occurred during rule development and after the rules were adopted where many facilities, realizing that their past emission reports were to be the basis of future allocations, amended prior year reports to enhance their allocations. Staff also met on an individual basis with most of the facilities to review the calculations.

Allocations and Reductions Required

In hindsight, several of these design features contributed to over allocation of the program in the first several years. The RECLAIM program design intentionally led to higher allocations than actual emissions during the first few years of the program because of concerns that facility production fluctuates from year to year and not wanting to lock in production levels during a recessionary period. Letting each facility pick a peak year for the basis of 1994 and 2000 allocations, allowing correction of prior year emission reports to increase allocations, and addition of existing ERCs held by RECLAIM facilities contributed to the inflated start point. The anticipated crossover point was five to six years after the program started.

Consider basing allocations on average prior activity levels rather than peak activity levels, to avoid over-allocation in early years

District staff did not expect that the amount of over-allocation would be as high as what occurred. The first year of the program there were 37 percent unused RTCs. In the second year there were 28 percent unused RTCs, in spite of the large use of RTCs to cover stringent emission estimates required under missing data procedures. Except for 2000 and 2001, the typical amount of unused RTCs each year is about 20 percent.

Reductions for the year 2000 were based on peak production levels and emission factors specific to the type of equipment or process. The year 2000 emission factors included rules that were subsumed by, or rolled into, RECLAIM that had future effective compliance dates and control measures from the 1991 AQMP.

Rules with future compliance dates included several rules that had been adopted by the District Governing Board and had been determined to be technically feasible and cost-effective. Other rules were considered to be technology forcing. Many of the 1991 AQMP measures would have

been contentious during rule making and the amount and timing of these reductions were less certain than the rules with future adoption dates.

District staff recommends that future cap-and-trade programs carefully evaluate which rules to roll into the program. Rules on the books with future control requirements based on known, cost-effective technology for major emitters may be best left in place. This would have largely

Rules with near-term compliance dates may be better left in place

avoided the power plant problems seen in 2000 and 2001 with RECLAIM, as Rule 1135 - Emissions of Oxides of

Nitrogen from Electric Power Generating Systems, if it had remained in effect, would have required Selective Catalytic Reduction (SCR) on power plants by the year 2000. The market incentive approach would work well for existing rule requirements based on technology-forcing rules and rules yet to be written.

RECLAIM reduction targets focused on NO_x and SO_x rule and control measures only. Concurrent NO_x benefits from existing and planned energy efficiency requirements, for example, were not considered. Future cap-and-trade programs should avoid giving credit for emission reductions that would occur under other regulatory requirements (local, state or federal) or natural industry trends. The term “anyway” credit was used to describe this effect relative to many of the concepts raised for potential mobile and area source credit generation. An example of this is electric forklifts. No credit rule was developed for electrification of forklifts because this was clearly happening to a large degree due to other factors that benefited facility operators.

District staff recommended that allocations be issued to facilities rather than auctioning them and also did not follow the model used in the Acid Rain program of holding back a small amount of the available allocations for an auction by the government. District staff did not want to add such an administrative process. As discussed in other parts of this paper, the rules were carefully crafted to avoid giving allocations the status of property rights.

Lessons Learned

- Recognizing early reductions are important.
- Allow time to develop, test and implement allocation methods.

- There are tensions between capping emissions, fair allocations and program goals that need to be carefully balanced.
- Consider using an average production level over a three to five year period as the basis for allocations, rather than allowing each facility to pick a peak production year.
- Limit the amount of time allowed (if any) for amending past emission reports to reduce the total amount of allocations.
- For a cap-and-trade program that replaces existing and future emission reduction commitments, carefully consider the value of leaving technologically feasible and cost-effective requirements in place. Use the market mechanism primarily for compliance requirements that are yet to be defined or have a longer time horizon.
- Avoid giving credit for reductions that would occur anyway due to other rules or programs.

Chapter Five – What Makes a Robust Market?

Author: Jill Whynot

There are several key features that help make a market work well. These are briefly described in this chapter.

In terms of design, it is generally advantageous to have a market with a large number of participants from varied industries. This helps maximize the economic advantages of a market as control costs will vary from industry to industry and from facility to facility within an industry.

For NO_x RECLAIM, initially 390 facilities were included at the start of the program. This represented six percent of the NO_x emitting facilities, but included 65 percent of the permitted stationary source emissions. For SO_x RECLAIM, 85 percent of the emissions from permitted stationary sources were included from about four percent of the facilities. There were facilities from a wide range of industries and they had very different reduction profiles. Many of the SO_x facilities are also in NO_x RECLAIM. This design helped to secure large emission reductions, make a more robust market, and had a manageable number of participants.

In any market, there are a variety of factors that influence decisions. Some facilities in RECLAIM that operate consistently below their allocation do not choose to sell credits to others.

Market behavior is influenced by many factors

This can be a corporate decision to retire unused credits as a good will gesture or can also be a strategy to avoid helping competitors.

It has also been our experience that some facilities have more sophisticated staff that can function better in a market environment. A cap-and-trade program with a declining balance requires a different mind set than command-and-control. Facilities have not always made the wisest decisions with respect to buying or selling credits.

Any market needs both buyers and sellers. Future trading programs should consider whether it will be acceptable for outside parties (not facilities) to purchase and sell credits. The RECLAIM market has evolved over time, which has resulted in some interesting trading experiences and a few enforcement problems.

Credits need to be fungible, or easily exchangeable, in order for trading to occur smoothly. Program designers will need to decide whether credits are issued for a discrete time period, such as one or more years, whether credits can be borrowed or banked, and how/if credits in the future can be traded. For RECLAIM, credits have a specific one year life, but in many cases infinite streams of credits are purchased to cover a facility's long-term needs. In addition, many different forms of trades have been seen with RECLAIM, such as forward contracts, contingent rights, and mutual funds. Recently, foreign traders have become involved in the market, which presents some unique enforceability issues.

A market functions well when the underlying rules are clearly established. Parties need to clearly understand the nature of credits, such as the time period for which they are valid and can be traded or used, how trades are to be processed and registered, and what each party's responsibilities are.

Administrative procedures should be as streamlined as much as possible to facilitate trades without delays. Good tracking and accounting mechanisms are also important to ensure that the system stays in balance and that credits are only used once to cover emissions.

Information is one of the most critical elements of a market. Facilities need to have time to plan in advance whether they will purchase credits to meet their needs or will invest in control equipment or other methods to reduce below their allocation and recoup some or all of the costs by selling credits. Electronic posting of trade information in a timely manner is also essential for market price signals and to provide cost information upon which facility operators can make decisions.

A good market can be run by government, by a designated third party, or by one or more entrepreneurs providing that service. For RECLAIM, the latter was developed, as the District did not want to be involved in that aspect of the market. It was less complicated for the District to be the sole registrar for credit trades and to set up the rules and systems to track credit trades and prices and to make that information available on a bulletin board system.

Information on market activities helps program participants make better decisions

Any market system needs good tracking and transparency of information. In addition, frequent and careful monitoring of prices and availability will help ensure that any necessary adjustments are identified and made to reduce the likelihood of problems.

Lessons Learned

- Market behavior is influenced by a variety of factors.
- Market participants do not always behave in a logical manner.
- Streamline administrative processes and post trade information as quickly as possible.
- Timely and accurate information helps with both compliance and market function.

Chapter Six – Information Management Needs

Authors: Chris Marlia and Roberta Lewis

The need for automation in the RECLAIM program was understood from the beginning primarily because of the complex interaction between the new regulatory components introduced by RECLAIM. IM staff worked very closely with RECLAIM implementation staff to automate as much of the process as practical, considering schedule and potential costs. Since the introduction of the RECLAIM program, several rules have been added to Regulation XX and most of the rules have been amended, some as many as 12 times. This fluidity in the rule specifics has been necessary to ensure the program delivers on pollutant reductions as well as overall cost savings, but small rule changes can have large impacts on automated systems. IM focused on the most stable business processes first such as electronic emission reporting. Evolving business processes, such as annual emission reporting and compliance reconciliation activities, needed to stabilize before the automation effort could provide a workable system.

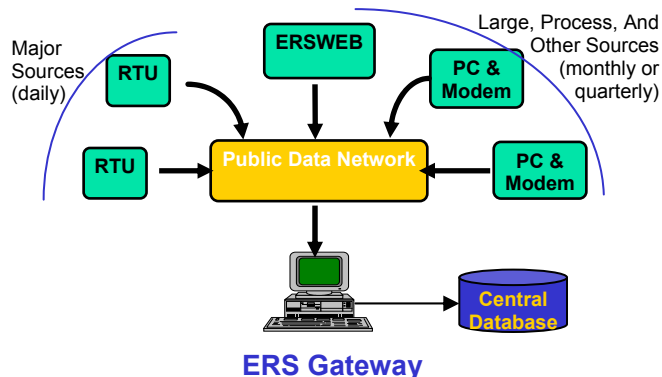
Automate stable business processes first, and add others later, as processes stabilize

Key elements in the automation of RECLAIM include electronic emission reporting, the facility permit system that captures device-based data, the trading system that tracks

emission credit trading, and a centralized database that stores all of the data from all automated systems in a single repository.

Electronic emission reporting is one of the most critical elements in the RECLAIM automation process. All sources report emission data electronically; source type determines if the data is submitted daily, monthly or quarterly. The data pathway from CEMS to Remote Terminal Units (RTU) to the AQMD's central station for electronic emission reporting, the Emission Reporting System (ERS), was established very early in the design and development process and the process has remained relatively unchanged. The facilities submit daily emission data as transactions (debits and credits) that can be summarized and aggregated over various time periods for comparison to the available annual allocation. The following figure illustrates the electronic monitoring and reporting for RECLAIM.

Figure I-6-1
Emissions – Electronic Monitoring and Reporting



The facility permit required a paradigm shift in the information collected for permitted sources. Under RECLAIM, existing equipment-based permits were replaced with facility permits.

Additional information for every emission source within the facility, including permit conditions and other permit parameters, need to be collected and brought into the centralized database. Facility permits are printed from the data-based information.

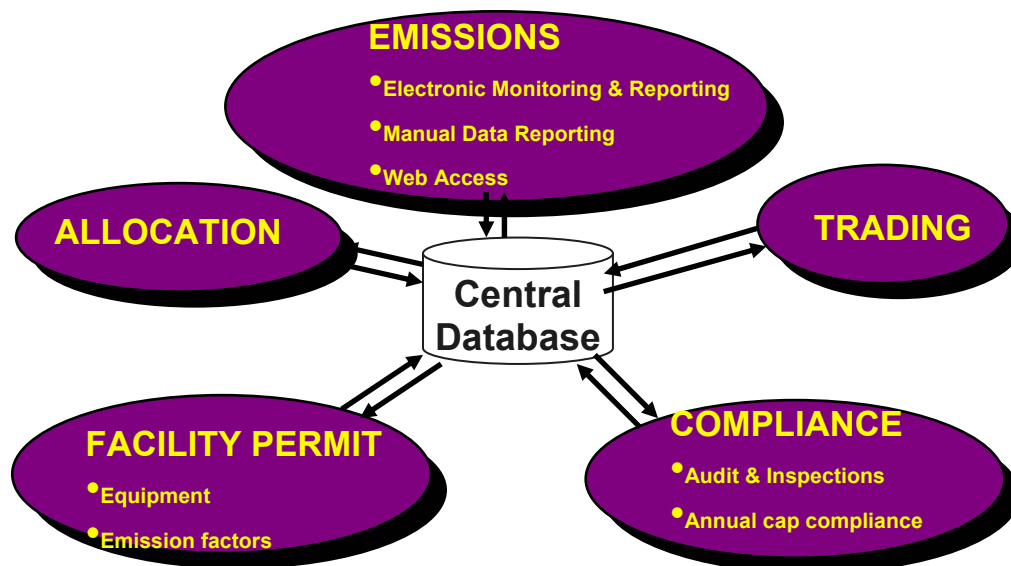
Balance automation needs with cost, complexity, and time constraints

The goal of an efficient trading market and the prerequisites that are attendant on that goal (simplicity, accessibility and enforceability) require an information dissemination system that makes important market information readily available to all market participants. In addition, trading credits that are transferred between entities must be certifiable and official ownership must be recorded. The RTC system has gone through several manifestations, starting with a trading database in Microsoft Access where many of the concepts for electronic tracking of trading credits were developed. This system encompasses the RTC Listing, an important requirement of the RECLAIM rules. The RTC Listing is essentially the account ledger for RTCs, recording all debits and credits for each facility or RTC-holding entity. The RECLAIM Bulletin Board System (BBS) was developed to provide information regarding trades and available credits to the regulated community.

Perhaps the most critical element in the automation of the RECLAIM rules is the centralized data repository which puts all of the data collected by each individual system in a single place. The central repository is a relational data base maintained on a central networked server and can be

accessed by all RECLAIM software applications and scripts. Figure I-6-2 illustrates the information tracking structure for RECLAIM.

Figure I-6-2
RECLAIM Information Tracking Structure



In addition to building systems that specifically support RECLAIM and its regulatory components, AQMD's infrastructure was strengthened over time and this helped to facilitate RECLAIM automation. During RECLAIM's early years, the data network backbone was upgraded to 100 mbps, a high-speed router was added, dynamic IP addressing was implemented, and the network was segmented into Virtual Local Area Networks (VLAN). Later, connections from the hubbed closets to the central hub were upgraded to multi-mode fiber and wiring in the computer room was upgraded to fiber optic cable. Finally, the network hardware was upgraded to Gigabit Ethernet technology and all of the wiring from the network closets to the desktop was upgraded to at least Category 5 copper. All of this effort improved network performance and fault tolerance, essential when collecting information from and providing information to outside users.

Similarly, centralized servers that support the central database and RECLAIM applications have been upgraded and desktop systems have been gradually improved over time to improve performance for the users of mission-critical applications.

Lessons Learned

- Staff developing and implementing the market program must work closely together with information technology staff from the beginning.
- The program design should consider the amount of automation needed for the program to be practical, but also consider cost, complexity, and time required for implementation.
- Automate stable business processes first and allow evolving business processes to stabilize prior to automation.
- Build up and strengthen the computing infrastructure (network, servers, desktop, etc.) as part of the program development to ensure smooth implementation and successful functioning into the future.

Chapter Seven – Other Considerations for Future Trading Programs

Author: Jill Whynot

Why Wasn't a VOC RECLAIM Program Successful?

NO_x and SO_x RECLAIM were adopted in 1993, although there were significant issues raised by industry and environmental groups. One of the reasons that industry supported the program was that it replaced many existing rules with future effective dates that had relatively high compliance costs. It was perceived that RECLAIM would provide flexibility to meet emission reductions targets without the prescriptive approach inherent in command-and-control regulations. RECLAIM also included many control measures from the AQMP which would not require individual rule development efforts if these requirements were added into RECLAIM.

One of the features that appealed to environmental groups was that RECLAIM locked in emission levels and reductions, although the program was initially started with high allocations. Improved accountability through enhanced monitoring, recordkeeping and reporting was also a design feature that had positive environmental implications.

District staff spent significant efforts in developing a similar cap-and-trade program for VOCs. VOC RECLAIM ultimately did not go forward, due to challenges with monitoring and recordkeeping and potential implications for toxic emissions, as products were reformulated and as facilities purchased credits in lieu of reductions.

One of the key differences for VOCs, as compared to NO_x and SO_x, was that there were fewer rules with future effective compliance dates that would have been folded in for VOC RECLAIM than what was the case for NO_x and SO_x. This provided much less incentive for industry participants to accept a mass cap and declining balance. Add to this the enhanced monitoring systems that would have been required and concerns about whether there would be shifts in, or less reductions, in toxic emissions associated with VOCs in solvents and coatings in a trading program, and VOC RECLAIM was a program that was not brought forward.

Other Factors to Consider

There are several other factors that should be considered for future cap-and-trade programs. The environmental justice community may have concerns about the ability to substitute local controls for reductions that occur in another part of the state, the nation, or internationally. Program designers should consider if there should be a minimum level of reductions at a facility before participating in purchasing credits, or whether it is a global issue and trading should occur freely to encourage the most cost-effective reductions.

Tracking trades and reductions to ensure compliance will be challenging for all reductions, and even more so for reductions that occur outside of California or in another country. It will be very important that protocols are standardized and that the level of monitoring and quality control is high in order to have good confidence in the trading program and the reductions that occur. Offset ratios to cover some of the uncertainty that may exist with reductions in other parts of the country or the world could be considered.

In some cases, there will be concurrent criteria pollutant reductions in future cap-and-trade programs, resulting from requirements already in place under other regulations. Consideration of whether and how to deal with credits in these circumstances will be needed. In addition, inter-pollutant exchange rates will have to be defined. These complex issues should be clearly articulated in the regulations developed to clarify what is allowed and provide the structure to enable or disallow these types of credits.

For a future greenhouse gas cap-and-trade program, careful consideration should be given to maximizing synergies with criteria pollutant programs. Since both criteria pollutant reductions and climate protection are important, it is critical that programs are coordinated well to avoid any delay in progress.